

FLIGHT

The
**AIRCRAFT
ENGINEER
&
AIRSHIPS**

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 682. (No. 3, Vol. XIV.)

JANUARY 19, 1922

[Weekly, Price 6d.
Post free, 7d.]

Flight,

The Aircraft Engineer and Airships

Editorial Offices: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2
Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828

Annual Subscription Rates, Post Free:
United Kingdom .. 30s. 4d. Abroad .. 33s. 0d.*
These rates are subject to any alteration found necessary under abnormal conditions and to increases in postage rates

* European subscriptions must be remitted in British currency

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EDITORIAL COMMENT



IN our issue of October 13, 1921, we published the report of the Court of Enquiry appointed to look into the circumstances occasioning the loss of H.M. Airship "R 38," and the Air Council's statement on the report. We also published, in the same issue, a communication from the Secretary of the Admiralty to the effect that the Admiralty were conducting a full investigation into the history of the design of the airship and of the initial stages of its construction up to October, 1919, when the responsibility for the design and construction of airships was transferred to the Air Ministry. The Admiralty report has now been issued, and is published elsewhere in this issue.

The main conclusions to be drawn from the report are that the Admiralty have come to the decision that, although the design was an advance on anything hitherto attempted, it did not incorporate any novel features which would affect the strength and safety of the ship, and that no undue risk was taken in the design. Briefly, the report states that during the period when the design of this airship was in preparation, the Director of Airship Production was responsible for the design and manufacture. His instructions required him to keep in close touch with the Superintendent of Airships, who was responsible for the formulation of general requirements in respect of the equipment and fittings of airships and for the final trial and acceptance of airships from the point of view of utility and fighting efficiency. The general requirements for new airships—i.e., the performances of which they were to be capable—were laid down by the Naval Staff, the Air Division of which acted as liaison with the Air Ministry.

During the summer of 1918 the problem of improved airships received a great deal of attention, and it was found that, to meet the latest requirements (long range, high speed, and a high ceiling) it would be necessary to build a very large ship. (These requirements were, of course, drawn up by the Naval Staff of the Admiralty.) As, however, no constructional sheds were available which were large enough to enable the construction to be carried out, it was decided that the requirements of the Naval Staff should be revised so as to fall within the limitations

DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

1922.

- Jan. 19 Lecture, "Aeroplane Installation," by Brig.-Gen. R. K. Bagnall-Wild, before R.Ae.S.
- Feb. 2 Lecture, "Radiological Research," by Dr. V. E. Pullin, before R.Ae.S.
- Feb. 7 & 8 Second Air Conference at Guildhall
- Feb. 16 Lecture, "Methods of Instruction in Aeroplane Flying," by Sq.-Leader Portal, before R.Ae.S.
- Mar. 2. Lecture, "Testing Aircraft to Destruction," by W. D. Douglas, before R.Ae.S.
- Mar. 26—
- April 2 Nice Meeting
- Mar. 30 Lecture, "The Design of a Commercial Aeroplane," by Capt. de Havilland, before R.Ae.S.
- July 6-20 French Gliding Competition
- Aug. 6 Gordon-Bennett Balloon Race, Geneva
- Sept. Tyrrhenian Cup, Italy
- Sept. Italian Grand Prix

imposed by existing constructional sheds. The revised requirements were considered at a conference of the Director of Air Division, the Director of Plans, the Superintendent of Airships, and the Director of Airship Production. The design recommended by this conference was approved by the Board of Admiralty, and work was commenced.

From this stage in the report and onwards it is interesting to compare the points brought forward by the Court of Enquiry with the statements contained in the Admiralty report. The former states that "having regard to the great differences in requirements between H.M. Airship 'R 38' and previous British airships, the design should have been examined by an official and competent Committee before actual construction was commenced." The Admiralty report maintains that although the requirements for which "R. 38" was designed were in advance of those affecting previous ships they "did not involve the introduction of any new principle, and on that account the design cannot be considered a novel one." Regarding the suggested discussion by an official and competent committee, the Admiralty report maintains that "there was at the time no body in existence which could have been called in to advise on the structural strength of 'R. 38.' Practically all the expert opinion which could have been of any assistance was already engaged upon the work. Had, therefore, any special committee been formed before the construction of 'R. 38' was commenced, it would necessarily have been composed mainly of these Admiralty and Air Force expert officers." The Admiralty report further points out that the Director of Airship Production was a member of the Advisory Committee for Aeronautics, and that the Airship Production Department was in constant touch with the National Physical Laboratory and received much information from the experiments carried out there. This last Admiralty statement is evidently a reply to the suggestion of the Court of Enquiry that "it appears evident that in some cases there was a lack of vital aerodynamic information as to the effect of the modifications on the strength of the structure."

Altogether, the Admiralty report does not seem to carry the matter much farther. It appears to us that neither one side nor the other has advanced any real proof one way or the other. One side says the design was not greatly different from previous ones. The other maintains that the new requirements were far ahead of anything previously demanded of British airships. The sum total appears to be that we are no nearer than we were to knowing who, if anyone, was to blame for the regrettable accident. There can be little doubt that "R. 38" did differ materially in design from previous British airships, and represented an attempt to catch up with the Germans by original design instead of being content with copying. The requirements were certainly exacting, and as the airship was meant for war purposes a certain amount of risk had to be taken. In other words, if the airship was to do its work it had to be lighter—and consequently possibly have a smaller factor of safety—than previous ships. Equally certainly there can be no doubt that those responsible for the design firmly believed that everything had been done to make the ship sufficiently strong. It is just in the interpretation of the word "sufficiently" that there can be an opening for differences of opinion. Airship design is not yet an exact science—far from it—and much has to be done by empirical methods, which may fail to foresee all the factors entering into the equation.

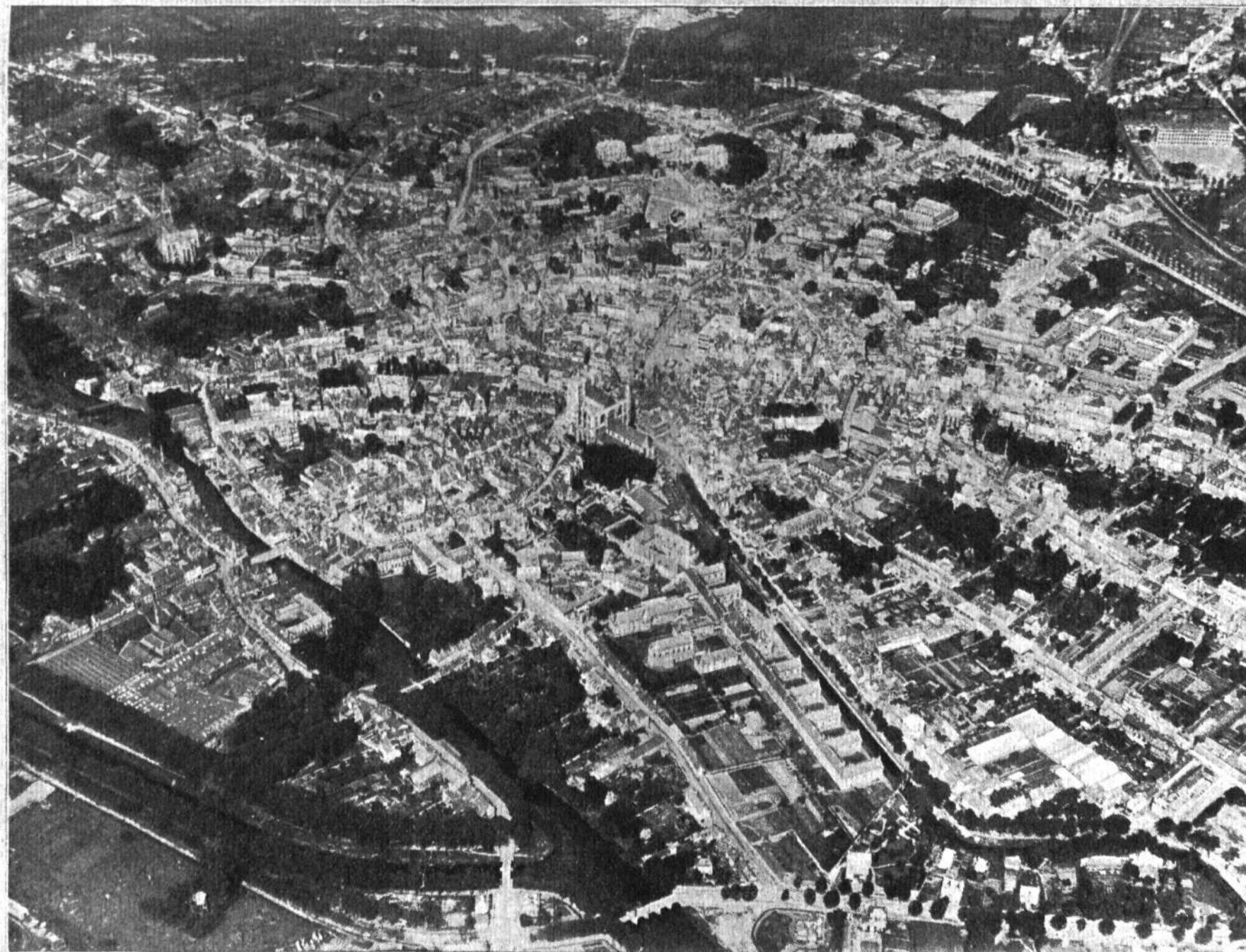
The Germans have reached their present high status in airship design and construction through full-scale experiments extending over twenty years or more. When, under the stress of war requirements, we attempted to take a short cut by trusting to calculations to take the place of long practical experience, we made a mistake which, unfortunately, cost us very dearly. Taking into consideration all the conflicting requirements, and the peculiarly difficult conditions under which the ship was built, we do not really think that there can be any question of blaming anyone in particular. Let it be remembered that, had the accident not occurred, the weakness might have remained undiscovered, and more ships might have been built suffering from the same defect. As it was we learned, in that short, intense period, a great deal about airship design and construction which we should not otherwise have known. If it were not for the hideous loss of valuable lives, there would be little to regret having regard to the set-off of experience gained.

♦ ♦ ♦

"Boats that Fly." It is with considerable satisfaction that we note the subject of Major Hume's juvenile lecture to the R.Ae.S. was "Boats that Fly." We have in this country sadly neglected the seaplane in the past, and although there are now signs of an awakening realisation of the importance of this type of craft to an Empire like ours, there is still room for vigorous propaganda among those who, by the time aviation takes its due place in the affairs of the world, will be the men and women to "see it through." We would like to point out that the subject is one which, although suitably treated with a view to the particular audience, is one of the greatest importance to those of us who can scarcely any longer come under the "juvenile" category. Separated (or connected, according to the point of view) as the parts of the British Empire are by leagues of sea, one would have thought that the natural development of aircraft would have been along the lines of seaplanes and flying boats rather than in the land aeroplane class. Yet this has not been the case, possibly because it is so very much easier to produce a machine which will get off comfortably from a specially prepared aerodrome than it is to produce a seaplane or flying boat that will get off a smooth or a rough sea as conditions dictate. The consequence has been that the land aeroplane has been developed to a very high state of efficiency, while its opposite number for use over the sea has been mainly confined to Naval requirements.

Realising the vital importance to the Empire of developing the seaplane—and incidentally the amphibian—it is a little strange that the Air Ministry, or rather the Controller of Civil Aviation, has not up to the present thought it worth while to allocate part of the Vote for Civil Aviation to the development of a regular seaplane service. There are in existence today machines which would certainly be able to meet the modest requirements of a mail service even if, through lack of development, we have not yet arrived at a satisfactory solution of the problem of the seaplane passenger machine. There is some talk of a service between London and one of the Irish ports, which would shorten the time taken by mails to America by at least one day. While there is no reason why such a scheme should not be perfectly feasible, there are possibly other routes which would be more promising.

JANUARY 19, 1922



LONDON-PARIS FROM THE AIR, AS SEEN FROM A HANDLEY PAGE MACHINE:
No. 23.—Abbéville.

Copyright Handley Page Ltd.

For instance, the London-Brussels and London-Amsterdam lines form the direct route to northern and central Europe, and they might very well be covered with seaplane or amphibian services, which would be able to follow a more direct route than that at present taken by the land machines, and would thus be able to effect a considerable saving in time on that score only, apart from doing away with the tedious journey from towns to land aerodromes. Flights carried out between London and Paris have shown the possibilities of using the rivers in the centre of towns as "aerodromes," and in the summer at any rate such services should be capable of being run with good regularity. We recommend the subject to the very serious consideration of those in authority.

Health of the R.A.F.

The report on the Health of the Royal Air Force for the year 1920 recently published by command of the Air Council does not include statistics relating to the Air Force in India, nor those relating to certain scattered units such as certain detached flights in the Middle East, drafts on board ship, and the African Aerial Survey Parties, for which it was found impracticable to introduce the approved system of returns.

The Royal Air Force system of medical administration is based on the principle originally instituted in the R.N.A.S. Stations, sick quarters being organised to provide bed accommodation for 1 per cent. of the station personnel, and having facilities for emergency treatment of serious accidents and cases requiring isolation. They are not intended to accommodate cases requiring hospital treatment. Illustrations of the value of this system, the report states, are especially shown in the many cases of sandfly fever and malaria treated entirely in sick quarters at Baghdad and Constantinople respectively in 1920,

No. 55 Squadron, which was only at Constantinople during July and August, being able to cope not only with the majority of its sick without evacuation to hospital, but also to proceed to Mesopotamia practically intact.

The report shows the general state of health of the R.A.F. to be good, and incidentally it indicates that the R.A.F. is not nearly such a dangerous career as might be imagined, whether in the branches doing actual flying or those working on the ground in various capacities. Thus the case incidence of flying accidents among officers and cadets was 21.0 per 1,000 of strength, and the death-rate 8.5. A considerable number of accidents are shown to be due to starting engines and swinging propellers, but, as the report states, the majority of these accidents can be considered as preventable, as they are usually due to holding the starting handle with thumb opposed to fingers, in the case of starting engines. Propeller swinging always has been a dangerous practice, and in commercial aviation it is rapidly disappearing. For military flying, however, it will probably survive for some time, at any rate for the smaller types of engines. It is not without interest to find that the number of accidents due to athletics is vastly greater than that due to flying, although the death-roll of flying is naturally higher than in sports.

It is stated in the report that, although of a primitive nature, the air ambulance has had an opportunity of proving its worth, and "the old blood wagon," as the air ambulance (a converted "D.H.9") was generally called, did such good work as to call forth the following statement, reprinted in the report: "Thus the aerial ambulance has shown that, especially in operations over country where other transport is so tedious and trying, the aeroplane is a veritable godsend for sick and wounded."

AIR PARCELS POST

THE Postmaster-General states that parcels are now accepted on behalf of the British air transport companies, at sixteen additional Post Offices in London, and in twenty-two additional towns in the provinces for conveyance by aeroplane and delivery in Paris each week-day. The additional London offices are the following:—

Hatton Garden; East Strand; Fenchurch Street; Finsbury Park; Kilburn; Knightsbridge; Leadenhall Street; Northern District Office; North-Western District Office; Peckham; St. James's Street; Shaftesbury Avenue; Stratford; Throgmorton Avenue; Westbourne Grove; Young Street, Kensington.

The provincial towns which have been added to the list of accepting centres are the undermentioned:—

Aberdeen; Blackburn; Brighton; Burnley; Derby; Dover; Dundee; Halifax; Huddersfield; Hull; Ipswich; Leicester; Luton; Newport (Mon.); Norwich; Nottingham; Reading; Rugby; Southampton; Walsall; West Bromwich; Wolverhampton.

The London and provincial centres which already participate in the arrangement are as follows:—

General Post Office, E.C.; Lombard Street; Threadneedle Street; Fleet Street; Western Central District Office; High Holborn; Charing Cross; Parliament Street; Western District Office; 191, Oxford Street; 148, Regent Street; 294, Regent Street; South-Western District Office; South-Eastern District Office; 21, Regent Street; Church Place, Piccadilly; Spring Street, Paddington; Croydon; Birmingham; Bradford; Bristol; Cardiff; Coventry; Edinburgh;

Glasgow; Leeds; Liverpool; Manchester; Newcastle-on-Tyne and Sheffield.

Parcels may be posted in the morning at certain London post offices for dispatch by aeroplane on the same day. At other London offices, and at the provincial offices parcels posted in the afternoon or evening will be forwarded by air on the following day. Enquiry as to the latest time of posting should be made at any accepting Post Office.

The aeroplanes leave Croydon about noon, and are due at Le Bourget (Paris) about 2½ hours later. The parcels are cleared through the French Customs, immediately after arrival, by the air transport companies, and are normally delivered to the addressees by the companies on the day of arrival, subject to payment of the small extra charge, usually made for such delivery. The saving in time of transmission afforded by the use of the air service and by the rapid clearance of parcels by the French customs is considerable.

The rates for parcels sent by air service are as follows:—

Up to 1 lb., 1s. 6d.; 2 lb., 2s. 3d.; 3 lb., 3s. 3d.; 4 lb., 4s.; 5 lb., 4s. 9d.; 6 lb., 5s. 9d.; 7 lb., 6s. 6d.; 8 lb., 7s. 3d.; 9 lb., 8s. 3d.; 10 lb., 9s.; 11 lb., 9s. 9d.

The above amounts are the inland parcel post rates, plus an air conveyance charge of 9d. per lb.

Further particulars of the conditions of the service may be obtained on application at any accepting Post Office. The names of the accepting offices and the latest times of posting in any of the provincial towns mentioned may be ascertained from the local Head Post Office.

Abolition of Air "Corridors"

THE regulations which have hitherto been in force relating to the "corridors" by which aircraft might enter and leave the U.K. have now been abolished, according to an Air Ministry "Notice to Airmen," which states: "The provisional agreement relating to aerial communication

between Great Britain and France (Article 12) has been amended in the following respect:—"The corridors of entry into Great Britain have been abolished. Aircraft may therefore cross the coast of Great Britain at any point, except over a prohibited area. The corridor of entry into France from Great Britain extends from Etaples to the Belgian frontier."

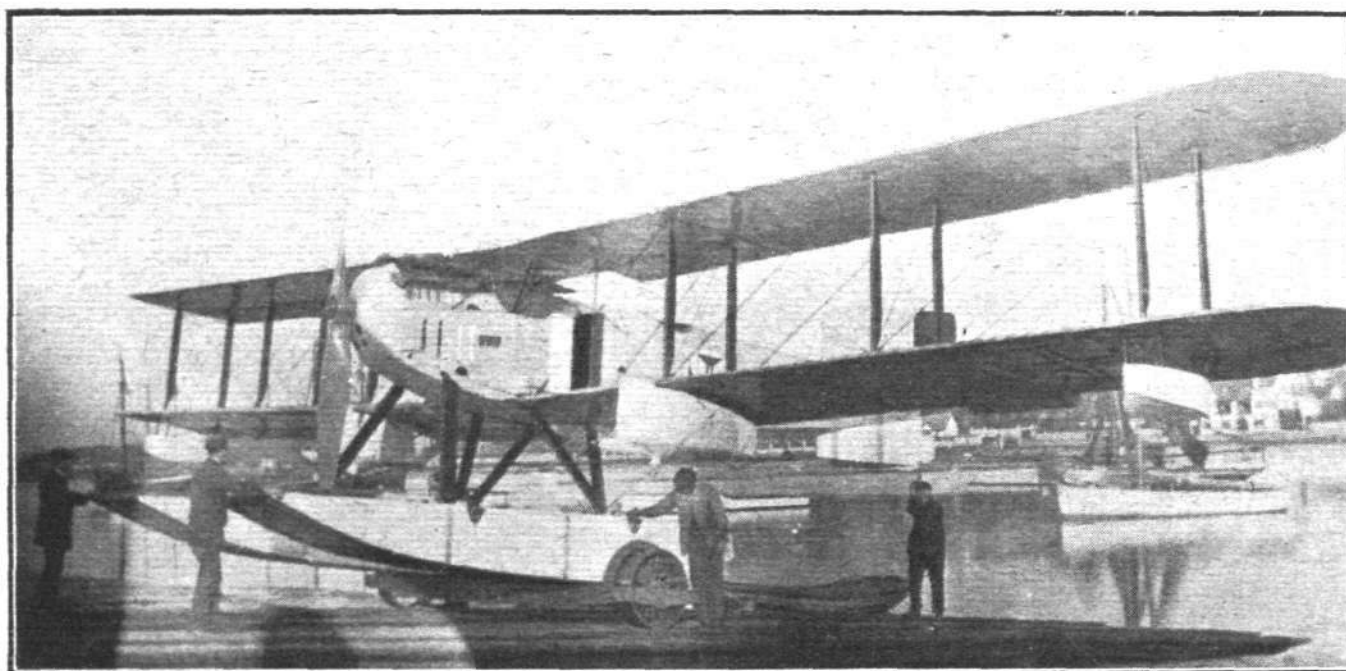
THE NEW FAIREY LONG-DISTANCE SEAPLANE

Rolls-Royce "Eagle" Engine

In our last issue we recorded briefly that a new Fairey seaplane had succeeded in carrying a useful load of over 3,000 lbs. with one Rolls-Royce engine. Taking the power of the "Eagle" as 375 h.p., the *useful* load carried was over 8 lbs./h.p., which is an extraordinarily good figure, and one which, incidentally, promises well for the future of commercial aviation. In war type of machines the useful load was frequently so small as to leave no margin, but as we get away from the war type and learn more about the commercial type, the increase in useful load per horse-power expended tends to show that it is only a matter of development to reach a point where a very considerable margin of useful load exists, which can be used for carrying passengers, goods, etc. Although the Fairey seaplane is not a commercial

The overall length is 36 ft. 6 ins., as compared with just over 36 ft. for the "C.IIID." Thus the length has scarcely been increased at all, the *fuselage* being practically that of the standard "IIID." The floats are somewhat larger, to support the extra load, but otherwise the machine is, in the main, a standard *fuselage* fitted with large wings. The Fairey Patent camber gear is, of course, incorporated, and this probably accounts in a great measure for the fact that the machine gets off well with such a heavy load.

It has already been mentioned that we are not at liberty to state the exact purpose for which the machine has been built, but it is not without interest to note that the machine was sold under a firm guarantee to carry out the stipulated performance within four months from the date of the order,

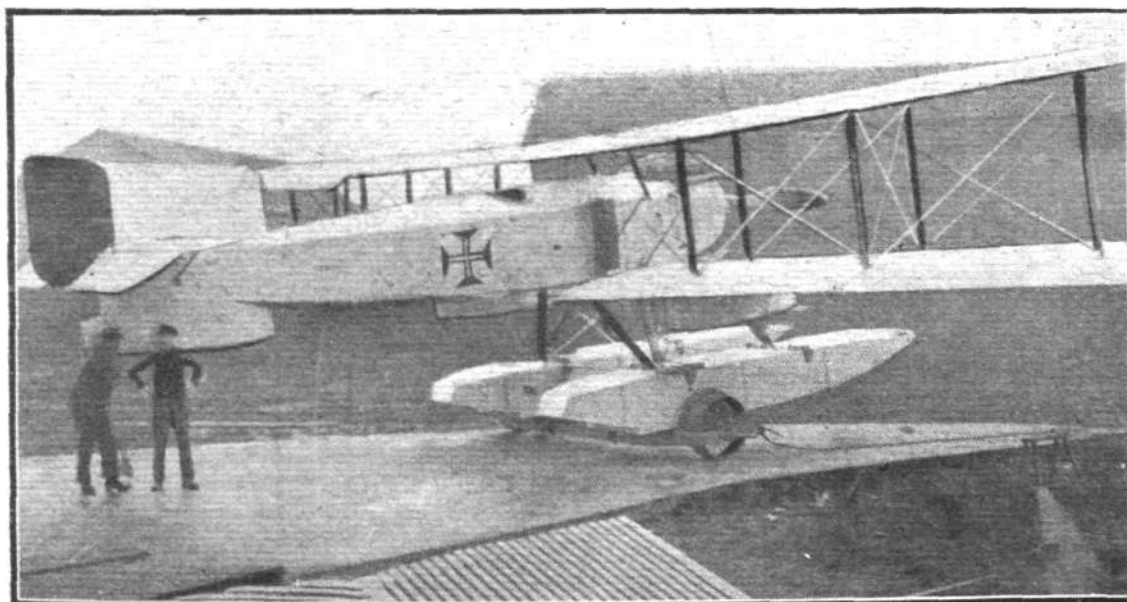


THE FAIREY LONG-DISTANCE SEAPLANE : Three-quarter front view of the machine on the slipway.

type, in the ordinary sense of the word, it will be useful to regard it in this light, specially as nothing may be said about the purpose for which the machine is actually intended.

The machine is well shown in the accompanying photographs. In its general lines it resembles the famous "C.III's," although naturally its proportions are quite different. The wings, it will be seen, are of very much larger span than those of the "C.III," measuring in fact 62 ft. from tip to tip.

so that it had to be designed, built and tested within that period. That the machine not only reached, but actually slightly surpassed, the calculated performance will not come as a surprise to those who know the Fairey designing staff, but it is a fine achievement nevertheless. The top speed developed was 95 m.p.h., with a power loading of over 19 lbs./h.p. and a wing loading of over 10 lbs./sq. ft. Naturally the climb, with such loadings, was not spectacular, but

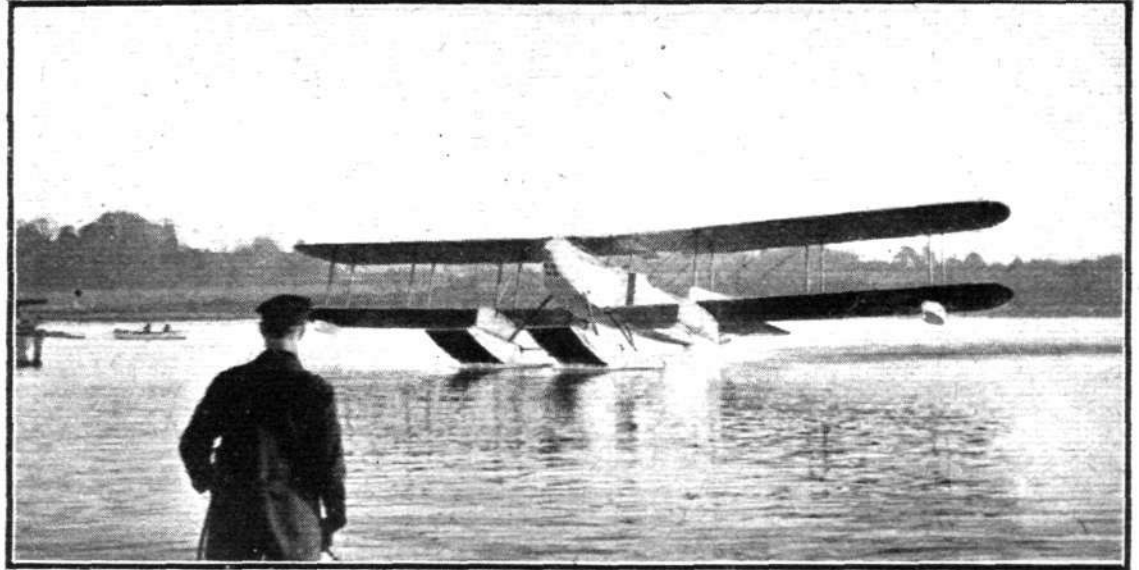


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The Fairey
long-distance
Seaplane: Three-
quarter rear
view.
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it reached 350 ft./min. in the earlier stages, which is certainly better than one would expect, again probably due to the camber gear. The landing speed was 42 knots, which would appear to give a very high lift coefficient, although some of the lift at large angles is, of course, due to other parts than the wings. As stated last week, the weight of the machine empty was 4,150 lbs. and the useful load 3,100 lbs., bringing the total loaded weight up to 7,250 lbs. Probably this is the greatest weight ever lifted by a single Rolls-Royce "Eagle."

with their paraphernalia, there would still be close on one ton available load left, which is surely approximating to a record for a machine fitted with an engine of 375 h.p. only. And even at that, the maximum speed is 95 m.p.h. with full load. This would appear to be sufficient for work on most "airways," although running the engine "all out" normally would not tend to give it a long life. By slightly reducing the useful load, however, the engine could be "nursed" once the machine was off the ground, and its life correspond-

The Fairey long-distance Seaplane: View of the machine taxiing in after a flight.



It is interesting to speculate on the possibilities of a similar machine, intended for commercial work and fitted with a wheel undercarriage. The saving in weight would be very considerable. We have no figures relating to the weight of the floats, but let us assume that the land undercarriage would be 300 lbs. lighter than the floats. The useful load would then become 3,400 lbs., which could be divided into any desired proportion of fuel and paying load. If we assume four hours' fuel, the remaining available load would be approximately 2,500 lbs. After deducting the weight of crew,

ingly increased. Such a machine should prove extremely useful, for instance as a goods' carrier. This would mean enlarging the fuselage somewhat, but this need not entail any very great increase in structure weight, nor in resistance.

Altogether the achievement is one of which the Fairey Aviation Company may well be proud, and when, in the near future, we come to use specialised types instead of "general utility" machines, the firm should be in a position to supply extremely economical machines somewhat of this type.

THE LONDON-CONTINENTAL SERVICES

FLIGHTS BETWEEN JANUARY 8 AND JANUARY 14, INCLUSIVE

Route†	No. of flights*	No. of passengers	No. of flights carrying		No. of journeys completed†	Average flying time	Fastest time made by	Type and (in brackets) Number of each type flying
			Mails	Goods				
Croydon-Paris ...	16	17	6	16	10	h. m. 2 18	D.H. 4 G-EAWH (1h. 49m.)	B. (1), D.H. 4 (1), D.H. 18 (2), G. (3), H.P. (2), Sp. (4), V. (1).
Paris-Croydon ...	18	39	4	14	12	2 58	D.H. 18 G-EARO (2h. 8m.)	B. (1), D.H. 4 (1), D.H. 18 (3), G. (4), H.P. (1), Sp. (3), V. (1).
Totals for week ...	34	56	10	30	22			

* Not including "private" flights.

† Including certain journeys when stops were made *en route*.

‡ Including certain diverted journeys.

Av. = Avro. B. = Breguet. Br. = Bristol. Bt. = B.A.T. D.H.4 = De Havilland 4, D.H.9 (etc.).
F. = Fokker. Fa. = Farman F.50. G. = Goliath Farman. H.P. = Handley Page. M. = Martinsyde. N. = Nieuport.
P. = Potez. R. = Rumpler. Sa. = Saimson. Se. = S.E. 5. Sp. = Spad. V. = Vickers Vimy. W. = Westland.

The following is a list of firms running services between London and Paris, Brussels, etc., etc.:—Co. des Grandes Expresses Aériennes; Handley Page Transport, Ltd.; Instone Air Line; Koninklijke Luchtvaart Maatschappij; Messageries Aériennes; Syndicat National pour l'Étude des Transports Aériens; Co. Transaérienne.

Honours

In the *London Gazette* of Jan. 13 the Air Ministry announces that the following decorations have been conferred by the President of the French Republic in recognition of valuable services rendered during the War, and that H.M. the King has given unrestricted permission to the officers concerned to wear the decorations awarded:—

Croix de Guerre

Capt. C. A. Taylor, R.A.F.

Lieut. R. J. Rodwell, R.A.F.

Aero Club of France President

As we foreshadowed, M. P. E. Flandin was, at the last meeting of the Executive Committee of the Club, elected President in place of M. Michelin, who recently resigned owing to ill-health—not fortunately through the death of this great patron of sport, as by a regrettable slip was erroneously stated last week. M. Flandin headed the voting list with 24, and from his past official connection with aviation should prove an active and valuable advocate of aeronautical progress.

THE "BRISTOL" 10-SEATER COMMERCIAL AEROPLANE

400 H.P. Bristol "Jupiter" Engine

IN our issue of July 7, 1921, we published an illustrated description of the "Bristol" 10-seater commercial biplane in its original form, with Napier engine and a four-wheeled undercarriage. This machine, it may be remembered, was designed by Mr. Reid, who has now succeeded Captain F. S. Barnwell as chief engineer and designer of the "Bristol" Aeroplane Company. Since the building of the original machine certain modifications have been made to component details, such as the undercarriage. As it was found that, even without the front wheels, the machine handled remarkably well on the ground, it was decided to do away with the extra weight of the two front wheels, which were consequently omitted. The machine has been to Martlesham for its type-tests, and has paid several flying visits to the Croydon aerodrome. It has been found to handle very well both on the ground and in the air, and it is expected that it will be put into actual commercial use on the airways in the coming spring and summer.

Lately the machine has been re-designed to take the Bristol "Jupiter" radial air-cooled engine. The result is shown in the accompanying photograph. It might have been thought that fitting a radial in the nose of the machine, and the absence of a radiator would have resulted in spoiling the appearance of the machine. This, however, is not the

the front wall of the cabin and face aft. A ninth passenger, or a mechanic, can be carried in the seat in the pilot's cockpit. The chairs are designed to fold up when not in use, and should it be desired for a single journey to use the machine for carrying goods, the cabin is fairly clear when the seats are folded. When the seats are removed from the cabin, a space for cargo is left measuring 10 ft. 6 in. in length 5 ft. 9 in. in height (in the centre), and 4 ft. in width. The cabin is lighted by windows in the sides, and there is an emergency exit in the roof. For cold weather flying the cabin can be heated by means of hot air muffs round the long exhaust pipes. Aft of the cockpit there is a lavatory, and in front of the cabin, under the pilot's cockpit, is a luggage compartment reached through a trap door in the floor. This luggage compartment measures 4 ft. 6 ins. in length, 4 ft. in width, and 2 ft. 6 ins. in height.

The pilot's cockpit is placed between the engine bulkhead and the front spar of the upper plane. From this position he obtains an excellent view forward and downward while, being practically on a level with the top plane, he can also see fairly well backwards. A wireless telegraph and telephone installation is provided for in the cockpit, and this is so placed as to be completely accessible to the engineer or navigator.



THE BRISTOL 10-SEATER, WITH "JUPITER" ENGINE: The new Bristol standard swivelling mounting is incorporated in this machine, and greatly facilitates inspection and minor adjustments.

case, as may be seen from the photograph. The manner in which Mr. Reid has run the covering from the comparatively small diameter at the front into the large section of the cabin leaves nothing to be desired as regards appearance, and also from the point of view of resistance the fuselage appears to have a very good shape. It may be remembered that the "Bristol" firm have carried out extensive experiments on engine mountings and fairings, and the present mounting represents the form found by experiment to be most efficient. This engine mounting was described and illustrated in our issue of October 13, 1921, and little need therefore be said about it here, beyond recalling that its distinctive feature is that it is swivelled or hinged along one side in such a manner that by undoing a few bolts the whole mounting can be swung laterally so as to give ready access to the rear of the engine without disturbing the petrol leads, which are so arranged that they run down along the hinged side and have sufficient flexibility to allow of a small amount of twisting and bending without requiring to be disconnected. The advantages of such a mounting for commercial work are obvious, as inspection is greatly facilitated. This should result in increased reliability, as it is well known that a part which is difficult to get at is often left alone, whereas a part that can be readily inspected usually receives its fair share of attention.

Apart from the alterations necessitated by the installation of the "Jupiter" engine, the 10-seater remains practically the same as before. The cabin has accommodation for eight passengers, of whom six are seated in upholstered seats facing forward, the other two occupying a cross-seat along

As a safety precaution against fire, there is a steel bulkhead aft of the engine, between it and the pilot's cockpit, and all control connections pass through glands. No petrol is carried in the fuselage aft of the fireproof bulkhead. The petrol system consists of two main petrol tanks slung under the bottom plane, where they are in a position easy of access for filling. The tanks have a capacity of 45 gallons each, and petrol is drawn from either of these tanks by two Vickers centrifugal pumps coupled in series, and delivered through a Vickers hand pump to the carburettors, any surplus being returned through a 10-gallon gravity tank fitted high up on the fireproof bulkhead. Smith's capacity gauges for both tanks are fitted on the instrument board.

As already mentioned, the undercarriage of the new machine is of the two-wheeled type. Rubber rings are used for suspension, and their carriers are so designed that the rings can be easily and quickly renewed. An oleo damper gear is incorporated, the special feature of which is the tapered needle valve so shaped as to give constant oil pressure through the whole stroke of the plunger (about 8 ins.).

The main characteristics of the "Bristol" 10-seater are as follows: Span, 57 ft. 6 in.; length o.a., 40 ft. 6 in.; height, 11 ft.; weight of machine empty, 4,000 lbs.; 90 gallons of petrol and 6 gallons of oil, 715 lbs.; crew (2), 320 lbs.; passengers (8), 1,200 lbs.; luggage, 350 lbs.; wireless, etc., 65 lbs.; total loaded weight, 6,650 lbs.; wing loading, 9.3 lbs./sq. ft.; power loading (Bristol "Jupiter" at 400 h.p.), 16.6 lbs./h.p.; speed at ground level, 112 m.p.h.; speed at 5,000 ft., 110 m.p.h.; climb to 1,000 ft., 1½ minutes to 5,000 ft., 13 minutes.

THE HANDLEY PAGE W.8 B.

Two Rolls-Royce "Eagle" Engines.

AFTER winning the Air Ministry Competition at Martlesham in 1920, the Handley Page W.8 remained, for various reasons, idle until fairly late in 1920, at any rate as far as actual commercial flying was concerned. When it was, finally, put on the London-Paris route it soon demonstrated that it was capable of making excellent time and of maintaining a good schedule, due to the ample margin of power which the two Napier "Lions" provided. Anyone who has seen the W.8 take off at Croydon must have realised that the reserve power was more than ample, the machine literally bouncing into the air after an exceedingly short run, and climbing at an angle which was more reminiscent of a scout than of the usual commercial passenger carrier. While, however, a good margin of power is the best possible manner of securing regularity and safety, a point is ultimately reached where economical reasons dictate a stop. For instance, although normally running the engines throttled down to about three-fourths or two-thirds of their maximum power results in increased life and reliability, the efficiency of the engines is not so good, owing to the smaller compression, if throttling is carried much farther. The petrol consumption is greater per horse-power developed, although smaller per engine, and consequently too great an excess of power results in a certain amount of waste.

In the case of the Handley Page W.8, practical experience has shown that not only is the excess of power provided by the Napier "Lions" too great, but that the speed of the machine so fitted is greater than is necessary for the work on the London-Paris line. It has, therefore, been decided to replace the present engines by Rolls-Royce "Eagles" of about 360 h.p. each, which will still give a sufficient margin of power and the requisite speed, while giving greater economy in running. Several of the new machines, which will be known as the Handley Page W.8 B, are to be put on the service in the spring, and will serve as a happy mean between the admittedly too-slow 0-400's and the too-fast W.8.

In order to obtain actual flying data of performance before installing the Rolls-Royce engines, an interesting experiment was tried. The Napier engines were fitted with Rolls-Royce propellers and the "Lions" throttled down to the power of the "Eagles." In this way actual conditions were fairly represented, and the tests thus carried out gave a very good indication of the performance which may be expected from the machine in its new form. The machine was loaded up with its proper quantity of petrol, and carried, in addition to pilot and mechanic, 16 passengers. The machine weighed, with fuel and water, 9,672 lbs., and the 20 passengers brought

the weight up to 12,000 lbs. On a basis of 360 h.p. per engine this gave a power loading of 16.7 lbs./h.p. With this loading, the following performance was obtained:—

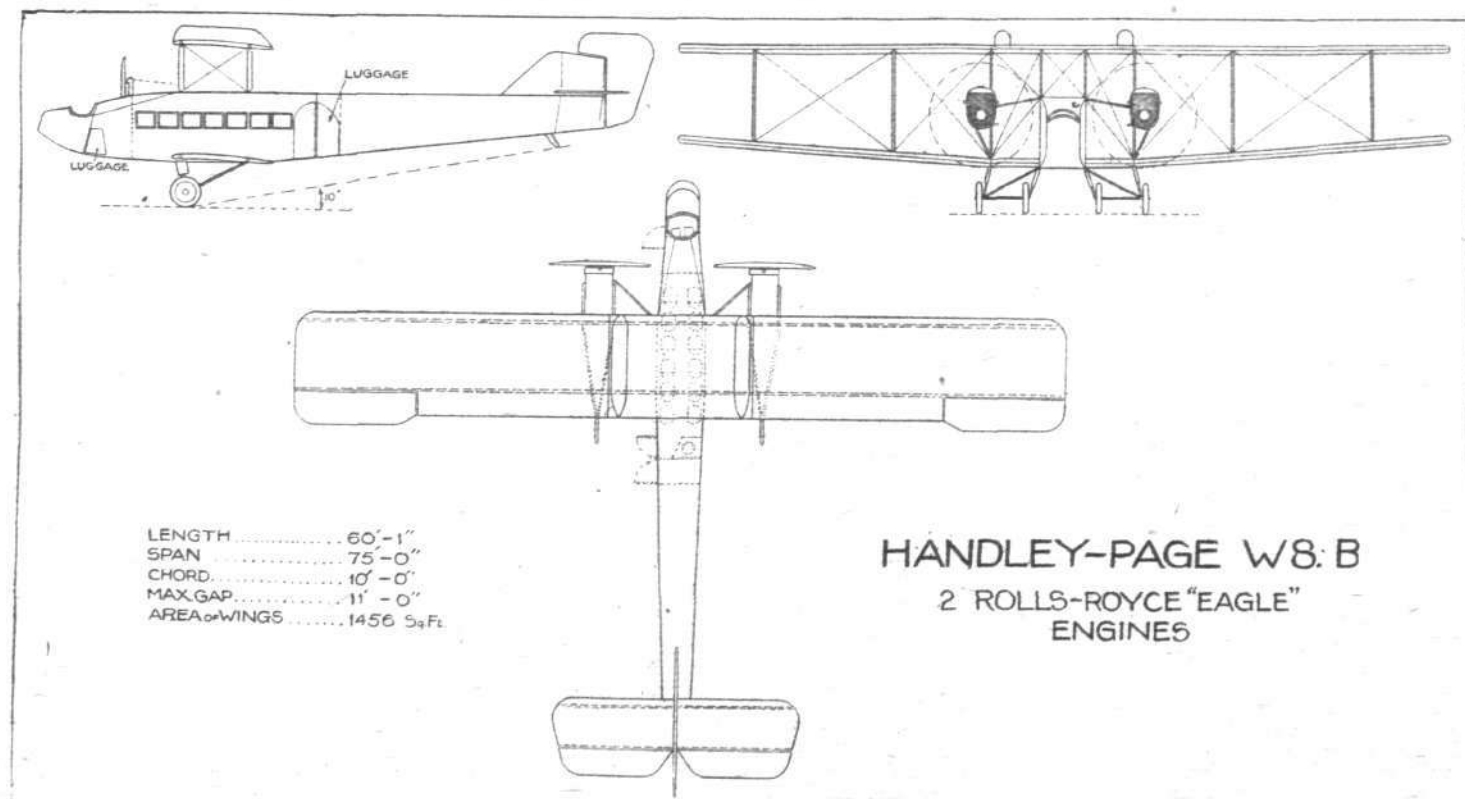
Time (mins.).	Height (ft.).	R.P.M. (average).	I.A.S. (m.p.h.).
1	425	1,510	73
2	1,000	1,525	75
3	1,550	1,530	75
4	1,900	1,550	75
5	2,300	1,560	79
6	2,850	1,550	75

The full speed was 103 m.p.h. at 1,675 r.p.m. and the cruising speed 90 m.p.h. at 1,500 r.p.m.

The accompanying general arrangement drawings, which have never hitherto been published, show the machine as it will appear when fitted with Rolls-Royce engines. Several modifications will at once be noticed. Thus an interesting innovation, as far as H.P. machines are concerned, is found in the placing of the petrol tanks. Instead of having the tanks in the engine nacelles, behind the engines, they are placed, in the W.8B, on top of the upper plane. One result of this arrangement is a greatly simplified petrol system. Instead of gravity tanks, petrol pumps, etc., with their extensive piping and joint there is a single pipe leading direct to the engine, with gravity feed from each main tank. Each tank has a capacity of 100 gallons, and great attention is being paid to such few joints as still remain in the petrol pipes. These joints, we understand, are to be metal couplings of the Air Ministry type, and no rubber joints will be employed. Each tank is provided with a petrol level indicator of the "Clift" pattern. Each of the engines is provided with an oil tank of 6½ gallons capacity, to which a thermometer is fitted.

Generally speaking, the mounting of the engines will not be greatly altered, except for such variations in dimensions as are necessitated by the difference in size of the two types of engine. Also, of course, with the transfer of the petrol tanks to the top plane, the long streamline fairing containing the present tanks will disappear, and we understand that it is not intended to streamline the Rolls engines, experience with the type 0-400 machines having shown that the gain in speed resulting from such streamlining is so small as to be scarcely worth while, especially when taking into consideration that the engines are very much more accessible when left uncovered. The engines will be fitted with long exhaust pipes of the R.A.E. pattern.

Apart from the alterations indicated above, the machines



THE HANDLEY PAGE W.8 B : General Arrangement Drawings.

will remain almost identical with the present W.8. The large cabin will have accommodation for 12 passengers, and light racks will be provided for light luggage. For heavier luggage there will be two special compartments, one between the pilot's cockpit and the cabin, of 80 cu. ft. capacity, and one aft of the cabin, of 70 cu. ft. capacity. A tip-up seat is placed at the side of that of the pilot so that, if desired, a mechanic can be carried here.

Needless to say, the machines will be constructed in accordance with all the usual requirements of the Air Ministry, and including a good degree of positive stability in all directions. A trimming tail is fitted so that the pilot may adjust the machine for any given conditions of load and speed in order that the machine may fly horizontally with little attention from the pilot except for corrections of course.

As regards equipment, the machine will be provided with the following instruments: Wireless telegraphy apparatus,

2 air-speed indicators, 2 altimeters, clinometers, 2 revs. indicators, 2 radiator thermometers, 2 oil pressure gauges, 2 petrol level indicators, 2 oil thermometers, and 2 Pyrene fire extinguishers (one in cabin).

The weight of the machine, and the loads carried are as follows:—Weight empty (with water): 7,700 lbs. Pilot, 160 lbs. Petrol for 3½ hours (this is not the full capacity of the tanks), 1,000 lbs., 10 gallons of oil 100 lbs. 12 passengers (at 180 lbs.), 2,160 lbs. Cargo, 880 lbs. Total loaded weight, 12,000 lbs.

The performance with full load will be approximately as follows:—Maximum speed near ground, 104 m.p.h.; maximum speed at 5,000 ft., 101 m.p.h.; ground rate of climb, 550 ft. per minute; service ceiling, 10,000 ft.; landing speed, 54 m.p.h.

Several of the W.8 B type of machines are now being built, and will be put on the London-Paris service in the spring.

THE LOSS OF "R.38."

The Report of the Admiralty.

At the time of the disaster which overtook the rigid airship "R.38" it was announced that the Admiralty would investigate the history of the design and earlier stages of construction, and that when these investigations had been completed, a report would be issued. This has now been done and the following statement issued by the Secretary of the Admiralty: "A full investigation has, in accordance with the decision of the Board of Admiralty at the time of the loss of the airship, been held into the history of the design and of the initial stages of her construction up to October, 1919, when responsibility for the design and construction of airships was transferred to the Air Ministry. The investigation was presided over by the Controller of the Navy (Rear-Admiral F. L. Field, C.B., C.M.G.), who was assisted by Sir Eustace d'Eyncourt, K.C.B., F.R.S., Director of Naval Construction, and Sir Charles Walker, K.C.B., Deputy Secretary of the Admiralty. The Committee, after careful consideration of all official records dealing with the design and construction of "R.38" up to the date mentioned, and after taking verbal evidence in amplification of them, have reported to the following effect:—

"During the period when the design of this airship was in preparation the Director of Airship Production was responsible for the design and manufacture of airships. His department comprised, *inter alia*, sections dealing with airship design, machinery design, hydrogen, chemical laboratory work, and experimental work. His instructions required him to keep in close touch on design matters with the Superintendent of Airships. The latter was responsible for the formulation of general requirements in respect of the equipment and fittings of airships and for the final trial and acceptance of airships from the point of view of utility and fighting efficiency. The general requirements for new airships, *i.e.*, the performances of which they were to be capable, were laid down by the Naval Staff, the Air Division of which acted as liaison with the Air Ministry.

"During the summer of 1918 the design and performances of British rigid airships received much consideration. Nos. 'R.33-37' were then the latest types in hand, and of these 'R.33-34' followed the German 'L.33' design and 'R.35-37' that of 'L.48.' It was thought that the stage had been reached when instead of copying German practice, with the consequent lag of many months, a design could be produced to meet specific British requirements. The requirements for such a vessel, to be ready for service about the end of 1919, were accordingly drawn up by the Naval Staff. These were for war operations in particular areas demanding a wide radius of action with high speed. It was found, however, that to meet these requirements it would be necessary to design a very large ship of 750 ft. in length, which moreover, could not be built in the existing constructional sheds. It was then decided that the requirements of the Naval Staff should be revised so as to fall within the limitations imposed by the existing constructional sheds. These requirements were reconsidered at a conference of the Director of Air Division, Director of Plans, Superintendent of Airships, and Director of Airship Production, and the conference recommended that a design known as Design A, which would meet the revised requirements and the constructional limitations, should be proceeded with. The Board of Admiralty approved on September 30, 1918, that the new airships 'R.38-41' should be built to this design.

"By January 20, 1919, about 100 girders for 'R.38'

were made, and steady progress was made with this work until towards the end of August, 1919, when practically all the girders for the main structure were completed, except those required for the extreme fore and aft portions of the ship. The erection of the frames was started about this time, and the first two frames were completed on October 21, *i.e.*, a day before the transfer was made to the Air Ministry. The remaining frames were completed after the transfer to the Air Ministry, at various dates up to November, 1920. There had been a continual progressive increase in the dimensions of rigid airships previously designed. Design 'A' was in the same way an advance on its predecessor, and necessitated fresh calculations. The new requirements did not, however, involve the introduction of any new principle, and on that account the design cannot be considered a novel one. In its preparation the Airship Production Department made use of existing information obtained from British experience and the experience and information of our French and Italian allies, and of such information in regard to German designs as could be obtained by the examination of those which fell into our hands, and, in fact, from all available sources of information. From the structural point of view the design followed closely that of 'R.33' and 'R.36,' with minor alterations introduced as a result of experience and later information. No undue risk was taken in the design, and there was no change from previous practice as regards safety which experience or a comparison with German airships did not make permissible.

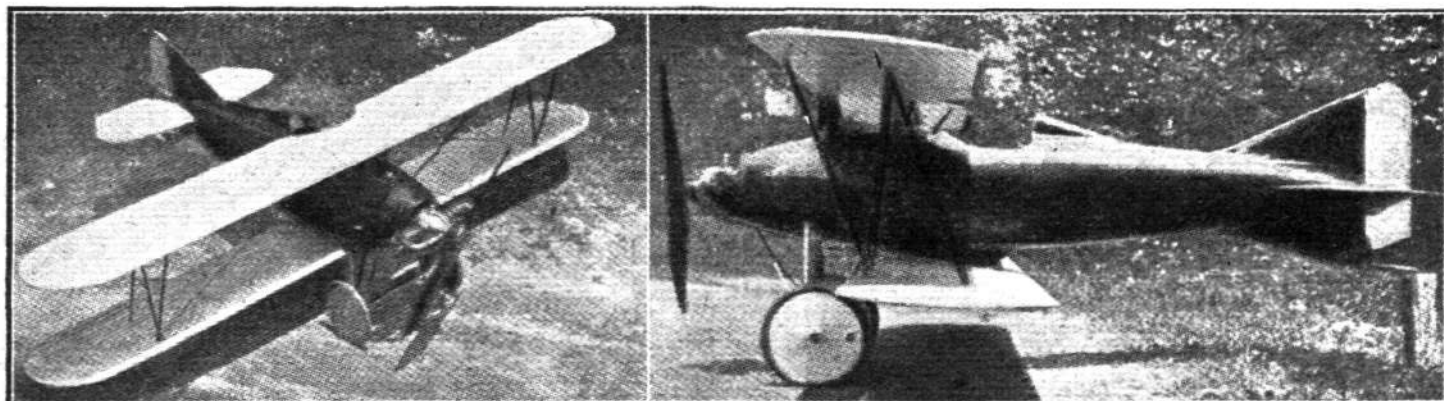
"The evidence furnished to the Committee shows that no modifications were made in the main structure of 'R.38' during the period the Admiralty were responsible for its construction, and that although additions were made in weight, there was nothing in these which would affect the structural strength of the ship. Evidence was furnished also that no important alterations were made in design after 'R.38' was turned over to the Air Ministry, but some modifications were made as a result of experiments to the fins and cars and in other parts of the vessel for lightness, which would not, however, affect the strength of the structure. With regard to the suggestion made by the Court of Inquiry into the circumstances of the loss of the airship that the 'R.38' design should have been discussed by an official and competent committee before actual construction was commenced, there was at the time no body in existence which could have been called in to advise on the structural design of 'R.38.' Practically all the expert opinion which could have been of any assistance was already engaged upon the work. Had therefore any special committee been formed before the construction of 'R.38' was commenced it would necessarily have been composed mainly of these Admiralty and Air Force expert officers.

"The Director of Airship Production was a member of the Advisory Committee for Aeronautics, and other Admiralty officers were associated with the sub-committees appointed by the Advisory Committee. The Airship Production Department was in constant touch with the National Physical Laboratory, and received much information from the experiments carried out there, and, as already stated, it had available the results of French and Italian experience and such information as was available regarding German ships. The actual flying officers responsible for taking over the ship were located in the same offices as the design staff, so as to facilitate the closest co-operation between the designer and user of the ship."

THE MUMMERT "BABY VAMP" SPORTPLANE

IN our issue for July 28 last, brief mention was made of a small machine—which was erroneously referred to as the "Maumert" instead of "Mummert"—tested by Bert Acosta, and we now give illustrations and some further particulars, for which we are indebted to our American contemporary *Aerial Age*, of this interesting little machine. It is of interest to note that on the same day as Bert Acosta tested the "Baby," he tried out the Remington-Burnelli 30-passenger 'bus—described in *FLIGHT* for July 28; and one of the accompanying illustrations showing these two machines together forms an amusing comparison.

bracing system. The principal characteristic of this truss consists in the elimination of the usual set of bracing cables between upper and lower rear spars and incidence and drift cables. To replace these there is but a pair of stream-line wires running from the *fuselage* at the lower front spar attachment to the upper rear spar at the point of attachment of the interplane strut. These wires constitute the flying wires, and also act as drift wires. There is but a single landing wire (stream-line) on each side of the *fuselage* running from the lower end of the front interplane strut to the top of the rear *fuselage*-strut. The interplane struts are of



THE MUMMERT "BABY VAMP" SPORTPLANE: On the left, a three-quarter front view from above, and on the right, a side view.

On the first test of the "Baby" the pilot held the machine on the ground for an initial run of about 200 ft. before taking off, but as soon as the machine got into the air it was observed to be flying very steadily at a speed even greater than its theoretical performances indicated—90 m.p.h.—estimated by observers on the ground at about 100 m.p.h. Later Acosta made an "Immelmann," which manoeuvre, as well as many others, the little machine performed in fine style. After fifteen minutes of flying, during which an altitude of 1,500 ft. was reached, the pilot made a perfect landing, and reported very favourably on the machine's behaviour. He stated that it had "absolutely no 'tricks,' and needed very few minor

stream-line steel tube, of N-formation, and two single struts support the top plane at the centre above the *fuselage*, into which they are built and form a part thereof.

The top plane is built in one continuous panel, with a cut-out portion at the trailing edge above the pilot's cockpit. The lower plane is also in one piece, and is mounted below the *fuselage*. The wings are built up with a total of 9 spars, not including the leading and trailing edges, which are of rectangular section $\frac{1}{4}$ -in. wide and varying in depth according to their location in the wing. The upper rear main spar and the lower front main spar are of the box type. Mahogany veneer, $\frac{1}{16}$ -in. thick, tacked to all the spars and edges is

The Mummert "Baby Vamp" Sportplane: A contrast in sizes. The "Baby," of 18 ft. span and 25 h.p. in front of the Remington-Burnelli 30-passenger twin-engine biplane of 74 ft. span and 800 h.p.—both of which were tested the same day by Bert Acosta.



adjustments," but, as to be expected with machines fitted with two-cylinder opposed engines, there was a certain amount of vibration, though this was by no means excessive.

Many new features of design and construction are to be found in various parts of the "Baby," and, apart from its extremely diminutive proportions, perhaps the most striking feature is the extensive use of veneer. This is used for the entire *fuselage*, and for covering the main planes and tail surfaces. Besides adding to the rigidity of the wing construction, this employment of veneer enables the correct shape of the wing section (R.A.F. 15) to be maintained at all times, thereby allowing the full value of this section to be obtained. The "Clark Truss" is used for the interplane

employed for the entire wing covering. *Ailerons* are fitted to the lower plane only, and these extend from wing tip to *fuselage*, where they are directly connected to the control stick. They are set into the wings on steel tubes, which leave no gap between the surfaces; and as the inner ends are operated by a small lever inside the *fuselage*, there are no external fittings to offer resistance.

The *fuselage* is of the monocoque type, built to stream-line shape on a specially constructed form. The veneer is wrapped spirally and reinforced internally by means of light hoops. At the stern the fin—which is in upper and lower sections—is built into the *fuselage*. The lower part of the fin carries the tail skid. Stick and rudder-bar control of the usual type is fitted, but the rudder is operated by cables enclosed in the



fuselage and connected to projections in continuation of the *fuselage* stream-line; these projections fit into the stem after the fashion of a socket and are "airtight."

A dashboard in front of the pilot carries the usual instruments, and the pilot's seat is of the bucket type, formed from a continuous strip of aluminium. A V-type landing chassis is fitted, the V's being of stream-line dash. The wheels are attached with the usual shock-absorber sprung axle.

The engine is an air-cooled twin cylinder opposed Lawrence, developing 25 h.p. at 1,800 r.p.m. Provision is made for carrying 12 gallons of petrol and two gallons of oil.

Mr. H. C. Mummert, the designer of the "Baby," is associated with the engineering department of the Curtiss Company's Garden City plant.



Cables Break Down; Aeroplanes Carry On

In the Mediterranean violent storms have prevailed recently, like unto those raging here, with the result that cable communication broke down between France and Morocco, touch being maintained by aeroplanes only, for several days. From Casablanca 600 telegrams, it is reported, were delivered by aeroplane the following day at Toulouse.

Air Mail Stamp Issues

SPECIAL issues for special flights appear to be the system employed by the Uruguay Post Office for the issue of air mail stamps. Some little time back, that country overprinted a small quantity of the 1900 25 c. stamps, with the device of an aeroplane and the inscription "Correo Aero" in black. These were apparently used on some special flight (real or imaginary), and are hard to get—and expensive at that. Now a second issue has, we understand, been put out, this time the overprint being in red, for an exhibition flight that was made between Mercedes (Soriano) and Rocha. No doubt these, also, are limited—except as regards price. What a game! Some countries have the air stamps, and no air services, whilst we have the air service, but no stamps!!

Berlin-Moscow by Air

FROM Berlin it is reported that the Moscow Soviet has approved a draft agreement with a German air line company for a regular service of postal and passenger aeroplanes between Moscow and Berlin via Kovno and Königsberg. It is added that the Lithuanian and Lettish Governments have given their assent to the scheme.

Proposed Lisbon-Paris Air Service

THE Companhia Portuguesa de Navegacao Aerea, it is reported, intends to open a regular air service between Lisbon and Paris shortly, with intermediary landings at Castello-Branco, Valladolid and Bordeaux. The Portuguese Government has, it is stated, placed the main aerodromes and various intermediary landing grounds on Portuguese territory at the disposal of the company gratis, and has promised that these grounds shall pass into the possession of the company in five years' time. The working capital of the undertaking is stated to be two million escudos. The following lines are projected:—Lisbon-Sines-Faro, Lisbon-Panpilhosa-Opporto, Lisbon-Portalegre-Madrid.

Air Routes in Brazil

THE President of Brazil has, says *The Times* Rio de Janeiro correspondent, given his assent to an Act authorising the expenditure of over £235,000 for the establishment of two aerial routes between the capital and Porto Alegre (in Rio Grande Do Sul). The one route, which is for hydroplanes, will follow the coast, while the other will be inland, following the railways where possible.

The routes are to be inaugurated before the opening of the Centennial Exhibition next September. Their primary object is military defence, but the routes may be used for commerce, with the Government's consent. Wireless telephone and telegraph stations with a range of 300 miles are to be established at convenient points at a minimum distance of 190 miles apart, and at the terminal points there will be powerful plants capable of direct intercommunication. Modern meteorological stations are also included in the scheme.

Canadian Aerodrome Facilities

WE have received from the Air Board of Canada "Notice to Airmen No. 8 of 1921," according to which it is evident that the Canadian Air Board is anxious to assist commercial aviation companies by placing at their disposal landing and storage facilities for aircraft at the Air Board Stations throughout the Dominion. The charges made appear to be very reasonable, stores being available at ledger prices *plus* 10 per cent. to cover freight and handling charges, services

The principal characteristics of the "Baby" are:—

Span	18 ft.
Chord	2 ft. 7½ ins.
Gap	2 ft. 9 ins.
Area of main planes (total)	90 sq. ft.
Area of tail plane	5 sq. ft.
Area of elevators	4 sq. ft.
Area of rudder	3 sq. ft.
Area of fins	3 sq. ft.
Weight (empty)	350 lb.
Weight (fully loaded)	590 lb.
Weight/sq. ft.	6.5 lb.
Weight/h.p.	23.6 lb.
Speed range (estimated)	43-90 m.p.h.



of mechanics charged by the hour at cost accounting charges, and the landing and taking off charges being as follows:—For small machines 50 cents, for medium machines 1 dollar, and for large machines 2 dollars. Open air storage is charged for at the following rates:—From two hours up to eight hours 25 cents per machine of any size; above eight hours, for each 24 hours, including first eight hours, 1 dollar per machine of any size. Charge per machine of any size per month 15 dollars. Hangar storage is correspondingly cheap, the fee per 100 sq. ft. or part thereof being 15 cents per day for unheated and 25 cents per day for heated hangar storage, the corresponding figures for monthly storage being 3 dollars and 5 dollars respectively.

The Second Peugeot "Aviette" Prize

CONDITIONS governing the second prize offered by M. Peugeot of 20,000 francs for a "flight" by a man-propelled machine have now been published. The new prize was offered immediately after the first prize of 10,000 francs was won by Gabriel Poulain on his Nieuport aviette, when in a "flying" jump he covered 10 metres both ways.

The main conditions set out are that the 20,000 francs prize goes to the first man who shall cover a distance of 50 metres (164 ft.), both ways, upon any form of machine propelled entirely by muscular effort. No independent assistance, force or power may be employed except upon the condition that any instrument of propulsive assistance so used must be carried by the competitor on his machine during his "flight."

The dates for making attempts in 1922 to gain the prize are April 23-30, June 23-30, July 24-31 and September 23-30, and possibly a supplementary date.

The number of tries for each competitor is limited to three, but the judges have powers to permit, in their discretion, extra attempts.

Up to 20 minutes' interval is allowed before the return "flight" in the opposite direction is made. In case no competitor succeeds in fully qualifying for the prize, but has covered the 50 metres in one direction, he may recommence his attempts *de novo*, and the judges may permit a restart to those competitors whom, although they may not have covered the first 50 metres, they deem worthy of another attempt.

Entries (fee 10 francs, returnable under certain conditions) must be made at least 10 days prior to any of the Aviette weeks above to the Maison Peugeot, 80 rue Danton, à Levallois-Perret (Seine), in the name of the competitor, together with the name of the constructor of the machine. The competition is international, but for both competitors and machines Germany, Austria, Turkey and Bulgaria are barred. The organising committee comprises: MM. le colonel Ferrus, Emmanuel Aimé, Jacques Balsan, Baudry, de Saunier, Charles Faroux, Isaac Koechlin, Chevalier Reén de Knyff, Lumet, Paul Panhard, Frantz-Reichel, Paul Rousseau.

Mr. Ashbolt and an Imperial Airship Service

MR. ASHBOLT, Agent-General for Tasmania, is, if anything, more determined than ever that the one great necessity for Imperial linking-up is by means of an Imperial Airship Service. Last week he lectured to the members of the Victoria League, when Dame Meriel Talbot presided. His delightful lecture, illustrated with photographs, was greatly appreciated, and it is very encouraging to learn from his closing remarks that he had been practically promised support for his scheme, to the extent of four million pounds, with which to initiate the commercial airship fleet which would be necessary for the experimental two years' period.

An "R.38" Memorial

HULL Corporation Parks Committee is consulting the Air Ministry on the question of a site for a memorial to the men who lost their lives in the "R.38" disaster.



Married

Flight-Lieut. CLAUDE HILTON KEITH, R.A.F., was married on January 4, at St. Mary Abbots, Kensington, to MARY ANGEL CONSTANCE, elder daughter of Mrs. J. P. MONTGOMERY, of Jesmond, Warsash, Hampshire. The Rev. H. D. I. Viener, C.B.E., Chaplain-in-Chief to the Royal Air Force, officiated.

The marriage took place on January 10, at St. Mary Abbots, Kensington, of Lord GORELL, Under-Secretary for Air, of 11, Catherine Street, Buckingham Gate, and ELIZABETH, daughter of Mr. and Mrs. ALEX. N. RADCLIFFE, of 45, Kensington Square, and Bag Park, Widecombe-in-the-Moor.

Among those present were: Air-Marshal Sir Hugh and Lady Trenchard, and Mr. W. F. Nicholson (representing the Air Council).

To be Married

A marriage is arranged, and will take place on February 1, at Farnborough, between Flying Officer B. CAILLARD, R.A.F., youngest son of Mr. and Mrs. Esmond Caillard, of Hove, Sussex, and MARY LILIAN, eldest daughter of Mr. and Mrs. MORRAT, of Cotswold, Farnborough Park, Hants.

The engagement is announced between Lieut. EDWARD MORTON DRUMMOND, Black Watch, attached R.A.F., eldest son of Mr. and Mrs. Gerald Drummond, Dayleside, Woodford, Essex, and DAPHNE EUNICE, youngest daughter of Mr. and Mrs. WILFRID TAYLOR, 12, Mitre Court Chambers, Temple, and 5, Norfolk Mansions, Battersea Park.

Deaths

Group-Captain ALAN JOHN LANCE SCOTT, C.B., M.C., A.F.C., passed away on January 16 in a nursing home, of double pneumonia, after only a few days' illness. The funeral service took place on Wednesday at Brompton Cemetery, with military honours. Captain Scott was probably one of the most efficient and practical officers connected with the Air Ministry. He was aged 39, and was the son of the late Henry

Alan Scott, of Holbrook, Horsham. Educated at Merton College, he was, as undergraduate, Master of the University Draghounds. On the outbreak of war he was studying for the Bar, and was an officer in the Sussex Yeomanry. He joined the R.A.F. early in the War, and was badly injured in an aeroplane accident in England, but eventually went to France in command of a squadron. Major Bishop, V.C., was at one time under his command. In 1920 Captain Scott wrote the history of his squadron (the 60th). When the War ended he was offered a permanent commission in the Air Force, and was shortly afterwards appointed Air Secretary to Mr. Winston Churchill, retaining that position under Captain Guest, and holding it up to the time of his death. Although not in the lime-light with the public, Captain Scott has probably one of the finest war records to his credit. His death will be keenly felt in the Air Ministry and with those left to mourn his loss.

The death of FRANCIS FARNALL THURSTAN, late Flight-Commander, R.N., is announced as taking place, at the early age of 44, on January 7, in a nursing home at Bournemouth, as the result of war service. Commander Thurstan was closely associated with aviation, having been with the Bristol Company from 1910 to 1914. When War broke out he joined the R.N.A.S., and served in Paris, Dunkerque, Newfoundland, etc. After the War he again took up aviation work for a short period, but tuberculosis, contracted in 1918 during his War work, speedily closed his career, he having to enter a nursing home, where he failed to recover. He leaves a widow and four children.

Items

LIEUT. FLORMAN, who has been appointed Air Attaché to the Swedish Legation, has arrived in London, and entered upon his duties.

GENERAL MITCHELL, chief of the American Aviation Corps, has arrived in Rome, and will, it is reported, visit the Italian aeronautical establishments.

ROYAL AERONAUTICAL SOCIETY (OFFICIAL NOTICES)



Election of Members.—The following Members were elected at a meeting of the Council held on Friday, December 16:—Associate Fellow, O. E. Simmonds, B.A.; Students, A. O. Adams, F. G. Kay, T. H. Smith; Members, V. S. Gaunt, D. Woods Mason, Capt. F. H. Parkes-Warmington.

Journal.—The January number of the *Aeronautical Journal*, which is now available, price 2s. 6d., contains the following papers:—"Requirements and Difficulties of Air Transport," by Col. F. Searle; "The Present State of Airship Development," by Major G. H. Scott.

Lecture.—The next meeting will take place at 5.30 p.m. on Thursday, January 19, at the Royal Society of Arts, John Street, Adelphi, when Brig.-Gen. R. K. Bagnall-Wild C.M.G., C.B.E., will read a paper on "Aeroplane Installation."

The lecture by Dr. V. E. Pullin on "Radiological Examination of Materials" has been postponed from February 2 to March 16, at 5.30 p.m., at the Royal Society of Arts.

Provincial Lectures.—In addition to the paper read on January 6, by Mr. H. L. Stevens, Associate Fellow, before the Coventry Engineering Society, on "Research on Full-Scale Aeroplanes," the following lectures to provincial engineering Societies have been arranged:—February 23 at 8 p.m., "Airworthiness," by Mr. F. E. Cowlin, A.F.R.Ae.S., before the Leeds Association of Engineers. March 1, "The Control of an Aeroplane," by Capt. G. T. R. Hill, A.F.R.Ae.S., before the Nottingham Society of Engineers.

Students' Meetings.—The next Students' Discussion Meeting will be held in the Society Library at 7 p.m., on Thursday, January 26, when Mr. Colin Daniel will inaugurate the discussion with a paper on "Practical Points of Fuselage

Construction." Mr. J. D. Frier, Associate Fellow, will take the Chair.

Swiss Glider Competition.—Details have been received through the Controller of Information, Air Ministry, of a soaring flight competition which is being held by the Suisse-Centrale Section of the Swiss Aero Club from March 8 to March 15 at Gstaad (Bernese-Oberland). A translation of the regulations can be inspected at the Society's Offices, and intending participants are asked to communicate with the Secretary. A course of instruction in practical soaring is being arranged at Gstaad from February 15 to March 15 in connection with the Competition.

Air Conference.—The following Members have been nominated to represent the Society at the Air Conference to be held in the Guildhall, London, on Monday and Tuesday, February 7 and 8:—Brig.-Gen. R. K. Bagnall-Wild, Dr. L. Bairstow, Wing-Comdr. Cave-Browne-Cave, H. Glauert, Major F. M. Green, Capt. G. de Havilland, Sqdr.-Ldr. R. M. Hill, Prof. B. Melvill Jones, Major D. H. Kennedy, Major A. R. Low, Lieut.-Col. W. Lockwood Marsh, A. Ogilvie, Lieut.-Col. M. O'Gorman, Dr. A. J. Sutton Pippard, A.V. Roe, Sir R. M. Ruck, Major G. H. Scott, R. V. Southwell, H. L. Stevens, H. T. Tizard, Major H. E. Wimperis, R. McKinnon Wood.

Library.—The following books have been received and placed in the Library:—"Bibliography of Aeronautics, 1909-1916, N.A.C.A.," "The Diesel Engine" by G. J. Wells and A. J. Wallis-Taylor, Howard Lectures on Aero Engines, A. E. L. Chorlton, Alloys Research Committee Reports Nos. 8, 9, 11, Institution of Mechanical Engineers, "Structural Analysis and Design of Airplanes," by Major T. H. Bane.

W. LOCKWOOD MARSH,
Secretary

THE ROYAL AIR FORCE

London Gazette, January 10, 1922

General Duties Branch

Flight-Lieut. J. R. McCrindle, O.B.E., M.C., is placed on half-pay, Scale B, from November 25, 1921, to December 31, 1921, inclusive. (Since resigned). Flight-Lieut. H. V. German is placed on half-pay, Scale B; December 27, 1921. Group Capt. J. H. W. Becke, C.M.G., D.S.O., A.F.C., is placed on the retired list, and is granted the hon. rank of Brig.-Gen.; February 29, 1920. (Substituted for *Gazettes* March 2, 1920, and March 12, 1920).

Memoranda.

Two Cadets are granted hon. commns. as Sec. Lieuts., with effect from the dates of their demobilisation.

The permission granted to Sec. Lieut. E. L. Finch to retain his rank is withdrawn, on his joining the Territorial Army; November 1, 1921.

Erratum.

New Year's Promotions, *FLIGHT*, January 5, 1922, page 12:—For Hugh Vernon Champion de Crespigny, read Hugh Vivian Champion de Crespigny; for Allen Robert Churchman, read Allan Robert Churchman.

London Gazette, January 13, 1922

General Duties Branch

Flying Offr. H. G. Crowe, M.C., is granted a permanent commn., retaining his present substantive rank and seny.; Nov. 17, 1921. Flying Offr. H. E. Ranson is granted a permanent commn., retaining his present substantive rank and seny.; Dec. 19, 1919 (*Gazette*, Dec. 19, 1919, appointing him to a short serv. commn., is cancelled).

The following are granted short serv. commns. as Pilot Offrs. on probation, with effect from, and with seny. of, the dates indicated:—*H. V. Alder; Dec. 31, 1921. A. K. Crowther, C. F. H. Grace, E. Marler, *R. L. Palmer, J. S. Phillips, H. J. Wykes, W. A. C. A. Yearsley; Dec. 29, 1921. (*Denotes previously served in R.A.F.)

Flight-Lieut. L. H. Slatter, O.B.E., D.S.C., D.F.C., is placed on half-pay, Scale B, from March 11 to March 20 inclusive. Flying Offr. J. H. Jephson resigns his permanent commn. and is granted rank of Capt.; Nov. 2, 1921. Flying Offr. E. G. Gaff resigns his permanent commn., and is permitted to retain the rank of Lieut.; Jan. 7. Flying Offr. R. F. Wallas resigns his short service commn., and is permitted to retain the rank of Lieut.; Jan. 11. Flying Offr. L. G. Shipcott is placed on the retd. list on account of ill-health, and is permitted to retain the rank of Lieut.; Jan. 11.

Stores Branch

Flying Offr. L. G. Stevenson is granted a permanent commn., retaining his present substantive rank and seny. with effect from Sept. 12, 1919, and is transferred to the Stores Branch, with effect from June 17, 1920. *Gazette* of Sept. 12, 1919, appointing him to a short service commn. is cancelled.

Flying Offr. F. C. Worton is placed on the retd. list on account of ill-health, and is permitted to retain the rank of Lieut.; Jan. 11.

Medical Service

G. Kinnear is granted a short service commn. as a Flying Offr., with effect from and with seny. of, Dec. 19, 1921. Flight Lieut. R. W. Ryan is granted a short service commn., retaining his present substantive rank and seny.; Jan. 1.

Capt. J. S. Smith, Army Dental Surgeon, is granted a temp. commn. as a Flight-Lieut. while attached for duty with R.A.F., with effect from Nov. 1, 1921, and with seny. of Jan. 27, 1919. He will continue to receive emoluments from Army funds. (Substituted for *Gazette* Dec. 27, 1921.)

Memorandum.

Capt. W. R. Baldwin-Wiseman relinquishes his temp. commn. on ceasing to be employed, and is permitted to retain his rank; Jan. 1.

Erratum.

Gazette of Nov. 15, 1921, page 9058, for L. B. J. Bunstead, read L. B. J. Bumstead.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

Pilot Officers. G. A. F. Bucknall, to No. 5 Flying Training School (Inland Area). On appointment to Permanent Commission. 30.12.21. H. J. Wykes, to No. 5 Flying Training School (Inland Area). On appointment to short service commission (on probation). 29.12.21. A. K. Crowther, to No. 5 Flying Training School (Inland Area). On appointment to short service commission (on probation). 29.12.21. C. F. H. Grace, to No. 5 Flying Training School (Inland Area). On appointment to short service commission (on probation). 29.12.21. J. S. Phillips, to No. 5 Flying Training School (Inland Area). On appointment to short service commission (on probation). 29.12.21. E. Marler, to No. 5 Flying Training School (Inland Area). On appointment to short service commission (on probation). 29.12.21. R. L. Palmer, to No. 2 Flying Training School (Inland Area). On appointment to short service commission (on probation). 29.12.21. W. A. C. A. Yearsley, to No. 2 Flying Training School (Inland Area). On appointment to short service commission (on probation). 29.12.21.

Group Captain.—N. J. Roche, O.B.E., from Headquarters, Coastal Area, to R.A.F. Depot (Inland Area). (Supernumery.) Whilst attending course at Royal Army Medical College. 16.1.22.

Wing Commanders.—F. Rankon, O.B.E., from Air Ministry (Directorate of Operations and Intelligence) to R.A.F. Depot (Inland Area). (Supernumery.) 6.1.22. H. W. Scott, M.B., B.A., to Headquarters, R.A.F., Cranwell, for duty as Principal Medical Officer and as Officer in charge of R.A.F. Hospital, Cranwell. 1.1.22. C. E. C. Stanford, D.S.O., M.B., B.Sc., from Inspectorate of Recruiting, Coastal Area, to Headquarters, Coastal Area, for temporary duty as Principal Medical Officer. 16.1.22.

Air-Commodore Swann, Director of Personnel

It is notified, by the Air Ministry, that Air-Commodore Oliver Swann, C.B., C.B.E., assumed duty as Director of Personnel on January 5, 1922, in succession to Vice-Admiral Sir C. F. Lambert, K.C.B., who recently relinquished this post.

R.A.F. Memorial Fund Football Week

A NOVEL scheme has been, through the R.A.F. Sports Board, adopted by the Royal Air Force this year, in an endeavour to increase the receipts of the R.A.F. Memorial Fund. By the generosity of Mr. Alexander Duckham, the fund has recently come into the possession of a large house and grounds known as Vanbrugh Castle, near Blackheath, and in August last a home for sons of deceased airmen was opened there. Sixteen boys were taken in immediately, and it is hoped to increase this number to the full capacity of 22 in the Spring. The boys are educated, fed and clothed, entirely by the Fund, at a cost of about £2,000 per annum.

To assist in this, and the several other objects of the Fund, the Royal Air Force Football Association have inaugurated an "R.A.F. Memorial Fund Football Week," lasting from January 21 to 28. During this period, all units have been asked to organise football matches, and to devote all gate receipts to the Fund, to make collections on all their grounds, and to endeavour to raise as much money as possible. The proposal has been received with enthusiasm, and it is hoped to raise a not inconsiderable sum. Diversions in the way of side-shows, and comic football matches are also being organised.

It is hoped that the public will give their generous support

Squadron Leaders.—A. A. B. Thomson, M.C., A.F.C., from Inter-Allied Aeronautical Commission of Control (Hungary), to R.A.F. Depot, Inland Area. Attached to Air Ministry (Directorate of Operations and Intelligence) for temporary duty. (Supernumery.) 18.12.21. T. G. Hetherington, C.B.E., from Half-pay list to Headquarters, Middle East Area. 6.1.22. W. B. Callaway, A.F.C., from R.A.F. Cadet College (Ground Wing) (Cranwell) to School of Naval Co-operation and Aerial Navigation (Coastal Area). 23.1.22. R. S. Maxwell, M.C., D.F.C., from No. 55 Squadron (Middle East Area) to R.A.F. Depot (Inland Area). (Supernumery.) 4.11.21.

Flight Lieutenants.—J. W. Harper, M.D., from Research Laboratory and Medical Officers' School of Instruction (Inland Area) to No. 1 School of Technical Training (Boys) (Halton), for duty as Medical Officer at Halton Hospital. 9.1.22. R. M. Bankes-Jones, from No. 1 School of Technical Training (Boys) (Halton) to No. 7 Group Headquarters (Inland Area). 12.1.22. A. R. Arnold, D.S.C., D.F.C., from Air Ministry (Directorate of Operations and Intelligence) to R.A.F. Depot (Inland Area). (Supernumery.) 10.1.22. J. H. W. Fitzgerald, from R.A.F. Depot (Inland Area) to Central Flying School (Inland Area). 9.1.22. O. W. De Putron. The recent notification wherein this Officer was posted from Experimental Section, Royal Aircraft Establishment, to School of Army Co-operation, with effect from 18.1.22, is hereby cancelled. C. H. B. Jenner-Parson, from Inspector of Recruiting (Newcastle) (Coastal Area) to Seaplane Training School (Coastal Area). 15.1.22. E. G. Hopcraft, D.S.C., from R.A.F. Base, Leuchars (205 Squadron) (Coastal Area) to Seaplane Training School (Coastal Area). 15.1.22. C. S. Richardson, M.B.E., from No. 4 Flying Training School (Middle East Area) to No. 6 Squadron (Middle East Area). 19.12.21. G. Boweu, from No. 45 Squadron (Middle East Area) to Iraq Group Headquarters (Middle East Area). 19.12.21.

to the scheme, to enable the Fund to commemorate the splendid services given to King and Country in the Great War, by the various branches of the flying services now all merged in the Royal Air Force.

The Memorial Fund Committee require £400,000 to enable them to carry out their original schemes. At present, a little over one-third has been raised.

Royal Air Force Hockey

THE results of the first round of the R.A.F. Inter-Unit Hockey Competition are as follows:—

No. 1 District

Gosport 4, Calshot, 3.
Winchester 7, Upavon 0.
Netheravon 11, Andover 0.
Lee-on-Solent—a bye.

No. 2 District

Martlesham w.o., Bircham Newton scr.
Leuchars w.o., Spittlegate scr.
Cranwell w.o., Shotwick scr.

No. 3 District

Halton (E) 2, Manston 0.
Uxbridge (H.Q.) 1, Grain 2.
Henlow 3, Ruislip 0.

The following is the draw for the second round, which is to be played off by January 23, 1922:—

No. 1 District.—Gosport v. Winchester; Netheravon v. Lee-on-Solent

No. 2 District.—Leuchars v. Martlesham; Cranwell—a bye.

No. 3 District.—Henlow v. Halton (E); Grain—a bye.

THE STUDENTS' SECTION OF THE ROYAL AERONAUTICAL SOCIETY

A Promising Branch of Interest to the Younger Generation

SINCE their inception a few months ago, the monthly discussion meetings of the Students' Section of the Royal Aeronautical Society have gradually become very popular, and there is now a very good attendance at these discussions. It is the custom to limit the attendance to Students of the Society, with a Member in the chair. Usually a Paper is read, and the rest of the evening is spent in discussing it. At the first meeting, which was held on October 13 last, a paper entitled "A Comparison of Different Types of Aerofoils" was read by Mr. T. A. Kirkup, the Chairman being H. B. Irving, B.Sc., A.F.R.Ae.S., of the N.P.L. On November 10, Mr. W. L. Le Page read a paper on "The Soaring Flight Problem," when Mr. Handley Page, A.F.R.Ae.S., was in the chair. The next meeting will be held on January 26, when Mr. Colin Daniel will read a Paper on "Some Practical Points in Fuselage Construction." The chair will be taken, on this occasion, by Mr. J. D. Frier, A.R.C.Sc., A.F.R.Ae.S. On February 23, Mr. G. R. Irvine will read a Paper entitled "Some Possible Improvements in Aero Engine Installation."

The Committee is, at present, composed as follows—Stanley H. Evans, Hon. Sec. (East London College), L. J. Jones (N.P.L.) and W. H. Rossiter (Northampton Engineering College).

For the information of those of our readers who are not already acquainted with the object of the Students' Section of the R.Ae.S., we might point out that membership is reserved for those under the age of 26 who are receiving a technical training such as will fit them in due course to become Associate-Fellows of the R.Ae.S. There is no entrance fee, and the subscription is only one guinea. Among the privileges enjoyed by students, mention may be made of the fact that students are entitled to attend the Society's lectures, receive the monthly journal free of charge, and borrow books from the Society's library. We can thoroughly recommend young men possessing the necessary qualifications to join this section of the Royal Aeronautical Society, and the subscription is so moderate that it need deter no one.

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The London Aero-Models Association

THE Members' exhibits on the Association stand at the Model Engineer Exhibition has caused great interest in the Association's work. Over 75 per cent. of model aeroplanes exhibited were made by the members L.A.M.A.

An annual general meeting will be held on Thursday, the 19th of January, 1922, and members are specially requested to be present at the election of officers for the ensuing 12 months.

On January 26 a lecture will be given by Mr. F. J. Camm. His subject will be "Model Aeronautical Research."

Membership forms can be had from the Hon. Sec., Mr. A. E. Jones, 48, Narcissus Road, West Hampstead, N.W. 6.

"The Model Engineer" Exhibition

"THE Model Engineer" Exhibition, which was held last week at the Royal Horticultural Hall, Westminster, was extremely successful—from the technical point of view, at any rate. On the occasion of our visit we were particularly and favourably impressed with the quality of the models exhibited—especially some of the competition models. We were somewhat disappointed, however, with the small part played by model aeroplanes and motor boats, the former being—as far as we could see—solely represented by a small exhibit by the London Aero Models Association. If the quantity was at fault, this was certainly not the case as far as quality was concerned, for the "L.A.M.A." models left little to be desired in this direction. In nearly every case these models—which were actual flyers—resembled "the real thing" to a remarkable degree, and the "flying stick" element was entirely absent, or almost so.

We noticed a model of a direct lift machine, but failed to gather anything of a startling nature from an inspection of same.

Wireless Telegraphy was well represented on many of the stands, and it is gratifying to see the increased interest this important and fascinating science is creating. Model railways and locomotives, however, seemed to be the most popular—and we are not surprised, for it was with the greatest difficulty that we could tear ourselves away from the fascination of watching a beautifully-made scale model locomotive of no more than 2 ft. or so, realistically puffing up and down the track with two 28 lb. weights as freight!

IMPORTS AND EXPORTS, 1920-1921

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "FLIGHT" for January 25, 1912; for 1912 and 1913, see "FLIGHT" for January 17, 1914; for 1914, see "FLIGHT" for January 15, 1915; for 1915, see "FLIGHT" for January 13, 1916; for 1916, see "FLIGHT" for January 11, 1917; for 1917, see "FLIGHT" for January 24, 1918; for 1918, see "FLIGHT" for January 16, 1919; for 1919, see "FLIGHT" for January 22, 1920; and for 1920, see "FLIGHT" for January 13, 1921.

	Imports		Exports		Re-Exportation	
	1920.	1921.	1920.	1921.	1920.	1921.
	£	£	£	£	£	£
Jan. ...	2,323	4,459	32,752	87,128	697	2,285
Feb. ...	9,320	2,379	68,932	59,829	—	19
Mar. ...	2,092	14	67,600	118,199	—	1,565
April...	5,918	1,370	148,484	138,983	—	450
May ...	761,425	3,350	237,627	59,624	400	1,818
June ...	491	5,181	300,572	79,713	61,150	—
July ...	51,020	540	286,646	530,628	—	850
August	116	343	130,774	111,595	2,544	—
Sept.	386	620	302,802	145,755	—	—
Oct. ...	445	4,256	106,954	101,567	913	580
Nov....	9	504	165,607	144,073	—	20
Dec. ...	2,805	950	69,720	116,430	405	2,120
	836,350	23,966	1,918,470	1,693,524	66,109	9,717

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Aircraft Company Registrations

FROM the summary of company registrations at Somerset House during 1921, compiled by Messrs. Jordan and Sons, Ltd., of Chancery Lane, new aircraft concerns do not loom very largely in the grand total of 99 million pounds odd (against about 569 millions in 1920!). The numbers recorded are two public companies with £1,100 capital and nine private companies with £78,300 total capital.

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AERONAUTICAL PATENT SPECIFICATIONS.

Abbreviations: cyl. = cylinder; I.C. = internal combustion; m. = motors. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1920

Published January 12, 1922

- 19,791. C. L. KEE. Laying of submarines by aircraft. (147,770.)
25,035. ALBATROS GES. FÜR FLUGZEUGUNTERNEHMUNGEN. Shock-absorbers for aircraft. (172,697.)
26,362. R. R. REED. Captive aeroplanes for training and amusement purposes. (172,732.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages iii and xiv).

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